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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,242	03/26/2004	James M. Harris	RED-P002	1754
7590 02/22/2006 Fernandez & Associates, LLP PO Box D Menlo Park, CA 94026-6402			EXAMINER LEE, CLOUD K	
			ART UNIT 3753	PAPER NUMBER
DATE MAILED: 02/22/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/810,242

Applicant(s)

HARRIS ET AL.

Examiner

Cloud K. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 16 is/are pending in the application.
- 4a) Of the above claim(s) 14 and 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-16 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3/26/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/26/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-13 and 16, drawn to microvalve, classified in class 251, subclass 11.
  - II. Claims 14 and 15, drawn to a mass flow control or pressure controller, classified in class 137, subclass 487.5.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require the cantilever element. The subcombination has separate utility such as a microvalve in a ink jet printer head.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

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Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

During a telephone conversation with James Harris (Reg. No. 52995) on February 13, 2006 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-13 and 16. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14 and 15 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Specification***

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The

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disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because legal phraseology often "means" in line 2 and 7. Correction is required. See MPEP § 608.01(b).

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "PTFE-like material" renders the claim indefinite since it is not clear what constitutes a PTFE-like material (i.e. what property of PTFE would be considered PTFE-like in this context?).

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6-8, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Harris (US Patent No. 6,149,123).

Regarding claims 1 and 6, Harris discloses a fluid guiding structure containing a fluid inlet port and a fluid outlet port (Figure 2, elements 520 and 510); a fluid communication channel (Figure 2, element 540), formed within said fluid guiding structure, fluidically coupling said fluid inlet port to said fluid outlet port; an intermediary port, formed within said fluid communication channel, said fluid inlet port being fluidically coupled to said fluid outlet port valve through said intermediary port; a cantilever element (Figure 2, element 300), moveably positioned proximate to said intermediary port within said fluid communication channel; an energy conversion body defining a chamber enclosing a working fluid (Figure 2, element 130), said energy conversion body being at least partially formed of a semiconductor material, said energy conversion body including a flexible membrane (Figure 2, element 200) mechanically coupled to said cantilever element through a first pedestal (Figure 2, element 210); said cantilever element normally closed over an inlet port (Col 4 line 20-23); and a stiffening means positioned on said flexible membrane proximate to said first pedestal and said fluid inlet port. Note that, all materials inherently have stiffness, therefore, we consider element 200 to have a “stiffening means” positioned on the membrane.

Regarding claims 2 and 7, “wherein said cantilever element includes a set of beams operative as a restoring force during deflection of said valve element by said flexible membrane.” Harris discloses cantilever element includes a set of beams operative as a restoring force during deflection of said valve element by said flexible membrane (Figure 7).

Regarding claims 3 and 8 "wherein said flexible membrane is single crystal silicon between 15 and 100 microns thick". Harris discloses a single crystal silicon between 15 and 100 microns thick (Col 6 line 51-53).

Regarding claim 11 "wherein said actuation means can extend said flexible membrane in a manner proportional to an amount of energy supplied to said actuation means". Harris discloses an actuation means can extend said flexible membrane in a manner proportional to an amount of energy supplied to said actuation means (Col 13 line 46-48)

Regarding claim 12 "wherein said cantilever element contains a compliant element attached onto a portion covering said inlet port". Harris discloses a cantilever element contains a compliant element attached onto a portion covering said inlet port (Figure 2).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris (US Patent No. 6,149,123) in view of Nestler (US Patent No. 5,040,567).

Regarding claims 1 and 6, Harris discloses a fluid guiding structure containing a fluid inlet port and a fluid outlet port (Figure 2, elements 520 and 510); a fluid communication channel (Figure 2, element 540), formed within said fluid guiding structure, fluidically coupling said fluid inlet port to said fluid outlet port; an intermediary port, formed within said fluid communication channel, said fluid inlet port being fluidically coupled to said fluid outlet port valve through said intermediary port; a cantilever element (Figure 2, element 300), moveably positioned proximate to said intermediary port within said fluid communication channel; an energy conversion body defining a chamber enclosing a working fluid (Figure 2, element 130), said energy conversion body being at least partially formed of a semiconductor material, said energy conversion body including a flexible membrane (Figure 2, element 200) mechanically coupled to said cantilever element through a first pedestal (Figure 2, element 210); said cantilever element normally closed over an inlet port (Col 4 line 20-23). Under a more narrow interpretation of "stiffening means", Harris fails to disclose a stiffening means



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positioned on said flexible membrane proximate to said first pedestal and said fluid inlet port.

Nestler discloses the stiffening means positioned on said flexible membrane proximate to said first pedestal and said fluid inlet port (Figure 2 element 20C). It would have been obvious to one of ordinary skill in the art at the time of the invention to have provided a stiffening means positioned on said flexible membrane proximate to said first pedestal and said fluid inlet port, as taught by Nestler, to prevent flexible membrane from deformation during operation (Col 3 line 50-54).

Regarding claims 2 and 7, "wherein said cantilever element includes a set of beams operative as a restoring force during deflection of said valve element by said flexible membrane." Harris discloses cantilever element includes a set of beams operative as a restoring force during deflection of said valve element by said flexible membrane (Figure 7).

Regarding claims 3 and 8 "wherein said flexible membrane is single crystal silicon between 15 and 100 microns thick". Harris discloses a single crystal silicon between 15 and 100 microns thick (Col 6 line 51-53).

Regarding claims 4 and 9 "wherein said stiffening means is one or more pedestals". Nestler discloses a stiffening mean is a pedestal (Figure 2 element 20C). Note, a pedestal is defined as any foundation, base or support.

Regarding claims 5 and 10 "wherein said stiffening means is one or more regions of increased thickness of said flexible membrane". Nestler discloses a stiffening mean increased thickness of said flexible membrane (Figure 2 element 20C).

Regarding claim 11 "wherein said actuation means can extend said flexible membrane in a manner proportional to an amount of energy supplied to said actuation means". Harris discloses an actuation means can extend said flexible membrane in a manner proportional to an amount of energy supplied to said actuation means (Col 13 line 46-48).

Regarding claim 12 "wherein said cantilever element contains a compliant element attached onto a portion covering said inlet port". Harris discloses a cantilever element contains a compliant element attached onto a portion covering said inlet port (Figure 2).

Regarding claim 13 "wherein said compliant element is a PTFE-like material". Harris discloses a micro-valve having a "wetted surfaces" made of or coated with Teflon® material, which is considered a "PTFE-like material".

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harris (US Patent No. 6,149,123) in view of Johnson (US Patent No. 5,619,177).

Regarding claim 16, Harris discloses an actuation means attached to a flexible membrane (Figure 2); said flexible membrane attached to a cantilever element through first pedestal (Figure 2 element 210); said cantilever element normally closed over an inlet port (Col 4 line 20-23); said inlet port in fluid communication with at least one outlet port (Figure 2); and a cantilever element (Figure 2 element 300). Harris failed to disclose a second pedestal proximate to said first pedestal, wherein said second pedestal is not attached to said flexible membrane.

Johnson et al discloses an actuator member carrying a sensor (Note, consider the sensor is a second pedestal). It would have been obvious to one of ordinary skill in the art at the time of the invention to have provided a sensor positioned on said cantilever element proximate to said first pedestal, wherein said second pedestal is not attached to said flexible membrane, as taught by Johnson, to sense the position of the cantilever element position (Col 8 line 40-44).

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bonne et al. (US Patent No. 5,323,999) discloses a flexible membrane and a cantilever element (Figure 5 element 92).

Dugan (US Patent No. 5,899,218) discloses a flexible membrane and provide three pedestals positioned on flexible membrane (Figure 9 element between 430s).

Richter (US Pub. No US 2004/0036047) discloses a flexible membrane (Figure 1a element 180) and a "pedestal" attaches to membrane (element 80).

Lisec (US Patent No. 5,681,024) discloses a moveable closure member having a second pedestal proximate to said first pedestal, wherein said second pedestal is not attached to said flexible membrane (Figure 1 element 4).

Wise (US Patent No. 5,417,235) discloses a flexible membrane (Figure 4 element 104) and a pedestal attaches to membrane (element 126).

Trah (US Patent Number 5,344,117) discloses a membrane with 4 force elements (Figure 4 element 2 and 3).

Goodwin-Johansson (US Patent No. 6,229,683) discloses a flexible membrane with 4 small pedestals attaches on it (Figure 6).

Ahn (US Patent No. 6,116,863) discloses an actuator member with 2 pedestals (Figure 2 element 25a and 25b), to provide fluid rate limitation.

Tsai (US Patent No. 6,032,689) discloses a cantilever element with 2 pedestals (Figure 1).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cloud K. Lee whose telephone number is (571)272-7206. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eric Keasel can be reached on (571)272-4929. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CL

A handwritten signature in black ink, appearing to read "Eric Keasel". The signature is fluid and cursive, with the first name "Eric" and last name "Keasel" clearly distinguishable.

Eric Keasel  
Acting SPE  
2/21/06